

## RESONANT CONTROLLED QUBIT SYSTEM

This application claims priority to United States Patent Application serial number

60/374,261 filed April 20, 2002; United States Patent Application serial number

5 60/385,123 filed May 31, 2002; and United States Patent Application serial number

60/395,704 filed July 12, 2002, each of which is hereby incorporated by reference in its entirety.

### FIELD OF THE INVENTION

10 The present invention relates to quantum computing. More specifically, the present invention relates to entangling the quantum state of superconducting qubits.

### CROSS-REFERENCE TO RELATED APPLICATIONS

15 This application is related to the following applications: United States Application Serial No. 09/452,749 entitled "Permanent Readout Superconducting Qubit" filed December 1, 1999; United States Application Serial No. 09/872,495 entitled "Quantum Processing System And Method For A Superconducting Phase Qubit" filed June 1, 2001;

20 United States Application Serial No. 0/025,848 entitled "Finger Squid Qubit Device" filed December 17, 2001; United States Application Serial No. 60/341,794, entitled "Characterization And Measurement of Superconducting Structures" filed December 18, 2001; United States Application Serial No. 60/349,663, entitled "Two Junction Phase Qubit" filed January 15, 2002; United States Application Serial No. 60/383,597 entitled

25 "Resonant Controlled Qubit System" filed April 20, 2002, each of which is incorporated herein by reference in their entirety.

### BACKGROUND

In 1982 Richard Feynman introduced the concept of a "quantum simulator." See

30 Feynman, 1982, "Simulating Physics with Computers", *Int. J. Theor. Phys.* 21, p. 467, which is hereby incorporated by reference in its entirety. Soon thereafter it was determined that a quantum system could be used to yield a potentially exponential time saving in certain types of intensive computations. See Deutsch, 1985, "Quantum Theory, the Church-Turing Principle and the Universal Quantum Computer", *Proc. of the Roy. Soc. of London A*400, p. 97, which is hereby incorporated by reference in its entirety.